SUMMARY OF PROJECTED CLIMATE CHANGES FOR ALASKA					
Climate Variable	**General Change Expected**	**Specific Change Expected & Reference Period**	**Size of Expected Change Compared to Recent Changes**	**Patterns of Change**	**Confidence**
Temperature	Increase	2050: +3°C ±2° ; 2100: +5°C ±3°	Large	More pronounced in autumn-winter, with winter increases of +8°C likely by 2100	>95% *Very likely* (for sign)
Precipitation	Increase	2050: 15-25% ± 15%; 2100:25-50% ±20%	Large	Fairly high % change, but high uncertainty and low baseline precip; drying effects of increased temperature and evapotranspiration may dominate	>90% *very likely* (for sign)
Relative Humidity	Little change	2050: 0% ±10%; 2100: 0% ±15%	Small	Absolute humidity increases	50% *About as likely as not*
Wind Speed	Increase	2050: +2% ±4%; 2100: +4% ±8%	Small	More pronounced in winter and spring	>90% (sign) *Likely*
Pacific Decadal Oscillation (atmospheric circulation)	Decadal to multidecadal circulation anomalies affecting Alaska	Unknown	Large (comparable to climatic jump in 1970s)	Major effect on Alaskan temperatures in cold season; acts as a wildcard within ongoing climate trends	Natural variation, essentially unpredictable
Extreme Events: Temperature	Warm Events Increase / Cold Events Decrease	2050: increase 3-6 times present for warm events; decrease to 1/5-1/3 of present in cold events; 2100: increase 5-8.5 times present in warm events; decrease 1/12 to 1/8 of present in cold events	Large	Increase in frequency and length of extreme hot events and decrease in extreme cold events (winter) due to warming trend, but no clear changes in overall variability	Modeled and observed >95% *Very likely (for sign)*
Extreme Events: Precipitation	Decrease/Increase	2050: -20% to +50%; 2100: -20% to +50%	Large	Increase in frequency and contribution especially in winter. Largest increase in autumn (large intermodel differences). Decreases in spring. Percent of annual precipitation falling as extreme events increases.	Modeled and observed *Uncertain*
Extreme Events: Storms	Increase	Increase in frequency and intensity	Any increases exacerbated by sea ice reduction and sea level increase	Increases at southern periphery of Arctic; little information for central Arctic	>66% *Likely*

Sea ice	Decrease	2050: 40-60% loss in Bering Sea (winter/spring); 20-70% loss in Chukchi/Beaufort (summer)	Comparable to recent changes	Longer ice-free season; less loss of sea ice in winter than in summer	>90% Very likely
Snow	Increased snowfall during winter, shorter snow season	2050: 10-25%; 2100: 20-50%	Recent changes not well established	Cold-season snow amounts will increase in Interior, Arctic; increased percentage of precipitation will fall as rain (especially in spring, autumn)	Large uncertainty in timing of snowmelt (warmer springs, more snow to melt)
Freeze-up date	Later in autumn	2050: 5-20 days 2100: 10-40 days	Large	highest near the north coast, but pronounced throughout the Arctic	>90% *Very likely* (sign)
Length of ice-free season for rivers, lakes	Increase	2050: 10-20 days 2100: 20-40 days	Large	Largest near coasts where sea ice retreats, open water season lengthens	>90% *Very likely*
River and stream temperatures	Increase	2050: 1-3°C 2100: 2-4°C	Large	Consistent with earlier breakup and higher temperatures	>90% *Very Likely*
Length of growing season	Increase	2050: 10 to 20 days 2100: 20 to 40 days	Continuation of recent changes	Largest near coasts	>90% Very likely
Permafrost	Increased area of permafrost degradation (annual mean temperature > 0°C)	2050: ~100-200 km northward displacement 2100: ~150-300 km northward displacement	Large	Permafrost degradation primarily in area of warm permafrost; less pertinent in the Arctic, although some degradation likely in southern Arctic and coastal areas.	>90% *Very likely* (sign)
Sea level	Increase	2050: 3 inches to 2 feet 2100: 7 inches to 6 feet	Large	Large uncertainties, esp. at upper end of range. Isostatic rebound is less likely in the north	>90% on sign, except in areas of strong isostatic uplift
Water availablility (summer soil H2O = P-PET)	Decrease	2050: decrease of 0-20+% 2100: decrease of 10-40+%	Recent changes not well established	Most profound changes in areas where sub-freezing temperatures have historically limited PET, therefor highly pertinent in the Arctic. Much uncertainty regarding role of winter water storage and spring runoff	>90% *Very likely*, but likelihood varies by region

Source & Context
IPCC (2007) and SNAP/UAF
IPCC(2007) and SNAP/UAF
SNAP/UAF
Abatzoglou and Brown*
Hartmann and Wendler (2005, J. Climate)
Abatzoglou and Brown*; Timlin and Walsh, 2007, *Arctic*)
Abatzoglou and Brown*
Rachel Loehman

Overland and Wang (2009)
AMAP/SWIPA (Snow, Water, Ice and Permafrost in the Arctic, 2011)
SNAP/UAF
IPCC (2007); SNAP/UAF
Kyle and Brabets (2001)
IPCC (2007); SNAP/UAF
SNAP and Geophysical Institute (UAF)
IPCC (2007)
SNAP and The Wilderness Society